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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,025	10/10/2001	Jung-Lim Yoon	SAM-0260	7520

7590

03/13/2003

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EXAMINER

PAREKH, NITIN

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/974,025

Applicant(s)

YOON ET AL.

Examiner

Nitin Parekh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of Group I, claims 1-5 in Paper No. 6 is acknowledged.

Oath/Declaration

2. The oath/declaration filed on 01/02/98 is acceptable.

Drawings

3. The formal drawings filed on 10/10/2001 are acceptable.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

5. If applicant is aware of any relevant prior art, he/she requested to cite it on form PTO-1449 in accordance with the guidelines set forth in M.P.E.P. 609.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 and 3-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Greer (US Pat. 6451681).

Regarding claim1, Greer discloses a flip chip type semiconductor device having pad and fuse areas (not numerically referenced –see device/pad area and peripheral fuse area in left and right side of the broken line respectively in Fig. 8; Col. 6, line 55- Col. 7, line 15) comprising:

- an interlayer insulation layer/IIL (116 in Fig. 8) formed on a semiconductor substrate (100 in Fig. 8)
- an insulating dielectric/passivation layer (118 in Fig. 8) formed on the IIL in a region/given region in pad and fuse areas
- a first metal line (124 in Fig. 8; Col. 3, line 4 and 15) formed in the region of the insulating/passivation layer having the pad area

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- a second metal line (124 in Fig. 8; Col. 7, line 15-37) formed in the region of the insulating dielectric/passivation layer having the fuse area
- a pad made of an aluminum (not shown in Fig. 8; Col. 3, line 63; Col. 7, line 10- see 202 in Fig. 3) covering a portion of the first metal line
- a fuse (802 in Fig. 8) covering the second metal line and a portion of the insulating dielectric/passivation underneath, the fuse being formed of an aluminum (Col. 7, line 28), the material being the same material as that of the pad
- a layer comprising a polyimide (302 and 706 in Fig. 3 and 8 respectively; Col. 7, line 8) covering the whole surface of the substrate including the pad and fuse, the polyimide layer having an opening exposing the pad, and
- an under-bump metal layer (UBML) pattern and a bump (314 and 310 in Fig. 3; Col. 4, line 37- 65) sequentially stacked on the exposed pad to form a flip chip (Col. 5, line 5) device

(Fig. 3, 7 and 8; Col. 6, line 52- Col. 8, line 38; Col. 3-5).

Greer further discloses the fuse (702 in Fig. 8) covering a pair of second metal lines (124 in Fig. 8) and the insulating dielectric/passivation layer there between (Col. 6, line 52- Col. 7, line 15).

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Regarding claim 3, Greer discloses the first and second metal lines/patterns including a copper layer (124 in Fig. 8) and a diffusion metal layer/pattern such as tantalum nitride (122 in Fig. 8) enclosing sidewalls and bottoms of copper layer (Col. 3, line 15; Col. 3, line 55).

Regarding claim 4, as explained above for claim 3, Greer discloses the diffusion/barrier metal layer being the tantalum nitride (122 in 8; Col. 3, line 55).

Regarding claim 5, Greer discloses the pad and the fuse including a barrier/adhesion layer and an aluminum layer/pattern being stacked in order (200/202 and 700/702 in Fig. 3 and 7/8 respectively; Col. 3, line 35-65; Col. 6, line 55- Col. 7, line 15).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable Greer (US Pat. 6451681) in view of the admitted prior art (APA).

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Regarding claim 2, Greer discloses substantially the entire claimed structure including the insulating dielectric/passivation layer as applied to claim 1 above, but fails to specify the passivation layer including a lower silicon nitride, an intermediate silicon oxide and an upper silicon nitride being stacked in order.

The APA teaches using the passivation layer including a lower silicon nitride, an intermediate silicon oxide and an upper silicon nitride (13/15/17 in Fig. 1) being stacked in order to provide an improved diffusion barrier and insulation for the device (see specification pages 1-3).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the passivation layer including a lower silicon nitride, an intermediate silicon oxide and an upper silicon nitride being stacked in order as taught by APA so that diffusion barrier and insulation can be improved in Greer's device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-308-7722, 703-308-7724 or 703-872-9318 (Right FAX) for regular communications; 703-872-9310 (Right FAX) for After Final communications and 703-872-9310 (Right FAX) for customer service.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Nitin Parekh

NP
03-07-03


TOM THOMAS
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